Section I (Amendments to Claims)

Please amend claims 38, 56 and 60, as set out in the following listing of claims 1-69.

1-37. (Cancelled)

38. (Currently Amended) A method of fabricating a ferroelectric PZT film on a substrate, comprising selecting MOCVD conditions for producing a ferroelectric PZT material, and forming the film by liquid delivery MOCVD on the substrate under said MOCVD conditions for producing said ferroelectric PZT material, wherein said selecting MOCVD conditions comprises:

> establishing a correlative empirical matrix of plots of each of ferroelectric polarization, leakage current density, and atomic percent lead in PZT films, as a function of each of temperature, pressure and liquid precursor solution A/B ratio, wherein A/B ratio is the ratio of Pb to (Zr + Ti);
> identifying from said plots an inflection point of each plot<u>, wherein</u> ~~as defining~~ a region of operation with respect to independent process variables of temperature, pressure and liquid precursor solution A/B ratio <u>corresponds to the inflection point or a vicinity thereof</u>; and
> conducting the liquid delivery MOCVD at temperature, pressure and liquid precursor solution A/B ratio values selected from said region of operation.

39. (Original) The method of claim 38, wherein the MOCVD conditions include use of a lead source reagent selected from the group consisting of $Pb(thd)_2$ and $Pb(thd)_2pmdeta$.

40. (Original) The method of claim 38, wherein the MOCVD conditions include use of a zirconium source reagent selected from the group consisting of $Zr(thd)_4$ and $Zr(O\text{-}i\text{-}Pr)_2(thd)_2$.

41. (Original) The method of claim 38, wherein the MOCVD conditions include use of Ti(O-i-

$Pr)_2(thd)_2$ as a titanium source reagent.

42. (Original) The method of claim 38, wherein the MOCVD conditions include use of $Pb(thd)_2$, $Ti(O\text{-}i\text{-}Pr)_2(thd)_2$ and $Zr(thd)_4$ as respective lead, titanium and zirconium source reagents.

43. (Original) The method of claim 38, wherein the MOCVD conditions include use of $Pb(thd)_2$pmdeta, $Ti(O\text{-}i\text{-}Pr)_2(thd)_2$ and $Zr(thd)_4$ as respective lead, titanium and zirconium source reagents.

44. (Original) The method of claim 38, wherein the MOCVD conditions include use of $Pb(thd)_2$pmdeta, $Ti(O\text{-}i\text{-}Pr)_2(thd)_2$ and $Zr(O\text{-}i\text{-}Pr)_2(thd)_2$ as respective lead, titanium and zirconium source reagents.

45. (Original) The method of claim 38, wherein the source reagents are provided for liquid delivery MOCVD in a solvent medium comprising one or more solvent species selected from the group consisting of: tetrahydrofuran, glyme solvents, alcohols, hydrocarbon solvents, hydroaryl solvents, amines, polyamines, and mixtures of two or more of the foregoing.

46. (Original) The method of claim 38, wherein the source reagents are provided for liquid delivery MOCVD in a solvent medium comprising tetrahydrofuran: isopropanol: tetraglyme in an 8:2:1 volume ratio.

47. (Original) The method of claim 38, wherein the source reagents are provided for liquid delivery MOCVD in a solvent medium comprising octane: decane: polyamine in a 5:4:1 volume ratio.

48. (Original) The method of claim 38, wherein the source reagents are provided for liquid delivery MOCVD in a solvent medium comprising octane: polyamine in a 9:1 volume ratio.

49. (Original) The method of claim 38, wherein the source reagents are provided for liquid delivery MOCVD in a solvent medium comprising tetrahydrofuran.

50. (Original) The method of claim 38, wherein the substrate comprises a noble metal.

51. (Original) The method of claim 38, wherein the substrate comprises a noble metal selected from the group consisting of iridium, platinum, and combinations thereof..

52. (Original) The method of claim 38, wherein the substrate comprises a TiAlN barrier layer overlaid by an iridium layer.

53. (Original) The method of claim 38, wherein the liquid delivery MOCVD includes vaporization of a source reagent solution to form precursor vapor therefrom and flowing the precursor vapor to a CVD chamber in a carrier gas.

54. (Original) The method of claim 53, wherein the carrier gas is selected from the group consisting of argon, helium and mixtures thereof.

55. (Original) The method according to claim 38, further comprising flowing to the CVD chamber an oxidant medium including at least one species selected from the group consisting of O_2, O_3, N_2O, and O_2/N_2O.

56. (Currently Amended) A method of fabricating a ferroelectric PZT film on a substrate, comprising selecting MOCVD conditions including nucleation conditions producing a ferroelectric PZT material, and forming the film by liquid delivery MOCVD on the substrate under said MOCVD conditions, wherein

said selecting MOCVD conditions comprises:

establishing a correlative empirical matrix of plots of each of ferroelectric polarization, leakage current density, and atomic percent lead in PZT films, as a function of each of temperature, pressure and liquid precursor solution A/B ratio, wherein A/B ratio is the ratio of Pb to (Zr + Ti);

identifying from said plots an inflection point of each plot, wherein ~~as defining~~ a region of operation with respect to independent process variables of temperature, pressure and liquid precursor solution A/B ratio corresponds to the inflection point or a vicinity thereof; and

conducting the liquid delivery MOCVD at temperature, pressure and liquid precursor solution A/B ratio values selected from said region of operation.

57. (Original) A method of fabricating a ferroelectric PZT film on a substrate, comprising forming the film by liquid delivery MOCVD on the substrate under MOCVD conditions including temperature, pressure and liquid precursor solution A/B ratio determined by plateau effect determination from a correlative empirical matrix of plots of each of ferroelectric polarization, leakage current density and atomic percent lead in PZT films, as a function of each of temperature, pressure and liquid precursor solution A/B ratio, wherein A/B ratio is the ratio of Pb to (Zr + Ti).

58. (Previously Presented) A method of fabricating a ferroelectric PZT film on a substrate, comprising forming the film by liquid delivery MOCVD on the substrate under MOCVD conditions including temperature, pressure and liquid precursor solution A/B ratio determined by plateau effect determination from a correlative empirical matrix of plots of each of ferroelectric polarization, leakage current density and atomic percent lead in PZT films, as a function of each of temperature, pressure and liquid precursor solution A/B ratio, wherein A/B ratio is the ratio of Pb to (Zr + Ti), and wherein said

ferroelectric PZT film comprises a ferroelectric PZT material having at least one scalable character selected from the group consisting of dimensionally scalable character, pulse length scalable character and E-field scalable character, and wherein said PZT material has at least one property selected from the group consisting of having a thickness from about 20 to about 150 nanometers, having a ferroelectric operating voltage below 2 Volts, having at least one Type 1 properties and having at least one Type 2 properties.

59. (Cancelled)

60. (Currently Amended) A method of fabricating a FeRAM device, comprising selecting MOCVD conditions producing a ferroelectric PZT material, and forming a capacitor on a substrate including a ferroelectric PZT material, wherein the ferroelectric PZT material is deposited by liquid delivery MOCVD under said MOCVD conditions yielding said ferroelectric PZT material, wherein said selecting MOCVD conditions comprises:

> establishing a correlative empirical matrix of plots of each of ferroelectric polarization, leakage current density, and atomic percent lead in PZT films, as a function of each of temperature, pressure and liquid precursor solution A/B ratio, wherein A/B ratio is the ratio of Pb to (Zr + Ti);
>
> identifying from said plots an inflection point of each plot, wherein ~~as defining~~ a region of operation with respect to independent process variables of temperature, pressure and liquid precursor solution A/B ratio corresponds to the inflection point or a vicinity thereof; and
>
> conducting the liquid delivery MOCVD at temperature, pressure and liquid precursor solution A/B ratio values selected from said region of operation.

61. (Cancelled)

62. (Previously Presented) The method of claim 60, wherein the PZT film defines a capacitor area of from about 10^4 μm^2 to about 10^{-2} μm^2.

63. (Cancelled)

64. (Cancelled)

65. (Previously Presented) The method of claim 38, wherein said MOCVD conditions comprise temperature in a range from about 400°C to about 1200°C, pressure in a range from about 0.1 to about 760 torr, and liquid precursor solution A/B ratio in a range of from about 0.52 to about 1.52.

66. (Previously Presented) The method of claim 38, wherein said ferroelectric PZT film has a ferroelectric polarization of greater than 20 μC/cm^2.

67. (Previously Presented) The method of claim 66, wherein said ferroelectric PZT film has a leakage current density of less than 10^{-4} A/cm^2.

68. (Previously Presented) The method of claim 67, wherein said ferroelectric PZT film has an atomic percent lead in a range of from about 49.43% to about 55%.

69. (Cancelled)